

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BOULT WADE TENNANT
27 Furnival Street
London EC4A 1PQ
ROYAUME-UNI

Date of mailing (day/month/year) 27 September 1999 (27.09.99)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference PA 3341	
International application No. PCT/GB98/00855	International filing date (day/month/year) 20 March 1998 (20.03.98)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address

COURTAULDS PACKAGING LIMITED
505 Ipswich Road
Colchester
Essex CO4 5HE
United Kingdom

State of Nationality

GB

State of Residence

GB

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☒ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address

BETTS UK LIMITED
505 Ipswich Road
Colchester
Essex CO4 4HE
United Kingdom

State of Nationality

GB

State of Residence

GB

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Maria Kirchner

Telephone No.: (41-22) 338.83.38

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PATENT COOPERATION TREATY

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PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

BOULT WADE TENNANT
27 Furnival Street
London EC4A 1PQ
ROYAUME-UNI

Date of mailing (day/month/year) 27 September 1999 (27.09.99)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference PA 3341	
International application No. PCT/GB98/00855	International filing date (day/month/year) 20 March 1998 (20.03.98)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address NEWBY, Martin, John J.Y. & G.W. Johnson Kingsbourne House 229-231 High Holborn London WC1V 7DP United Kingdom	State of Nationality	State of Residence
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☒ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address BOULT WADE TENNANT 27 Furnival Street London EC4A 1PQ United Kingdom	State of Nationality	State of Residence
	Telephone No. 020 7430 7500	
	Facsimile No. 020 7831 1768	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned
<input type="checkbox"/> the International Preliminary Examining Authority	<input checked="" type="checkbox"/> other: Previous agent - Newby, Martin, John.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Maria Kirchner
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

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The demand must be filed directly with the competent International Preliminary Examining Authority. If two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/

COPY

PCT
DEMAND

CHAPTER II

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION	
Applicant's or agent's file reference PA 3341/113	
International application No. PCT/GB98/00855	International filing date (day/month/year) 20th March 1998 (20.03.98.)
(Earliest) Priority date (day/month/year) 21st March 1997 (21.03.97.)	
Title of invention LAMINATED MATERIALS AND CONTAINERS THEREFROM	
Box No. II APPLICANT(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) Courtaulds Packaging Limited, 505 Ipswich Road, Colchester, Essex, CO4 5HE, United Kingdom	Telephone No.: Facsimile No.: Teleprinter No.:
State (that is, country) of nationality: United Kingdom	State (that is, country) of residence: United Kingdom
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) ASHMAN, Philip Colin 4 Godfreys Wood, Melton, Woodbridge, Suffolk, IP11 1QY, United Kingdom	
State (that is, country) of nationality: United Kingdom	State (that is, country) of residence: United Kingdom
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) BENNETT, Julian 9 Frere Way, Fingringhoe, Colchester, Essex CO5 7BP, United Kingdom	
State (that is, country) of nationality: United Kingdom	State (that is, country) of residence: United Kingdom
<input checked="" type="checkbox"/> Further applicants are indicated on a continuation sheet.	

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Continuation of Box No. II APPLICANT(S)

If none of the following sub-boxes is used, this sheet should not be included in the demand.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

BRANCH, Mark Graham
2 Park Close,
Ashby-de-la-Zouch,
Leicester
LE65 2FS,
United Kingdom

State (that is, country) of nationality:
United Kingdom

State (that is, country) of residence:
United Kingdom

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

State (that is, country) of nationality:

State (that is, country) of residence:

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

State (that is, country) of nationality:

State (that is, country) of residence:

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

State (that is, country) of nationality:

State (that is, country) of residence:

☐ Further applicants are indicated on another continuation sheet.

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Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCEThe following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*NEWBY, Martin John
J.Y. & G.W. Johnson
Kingsbourne House,
229-231 High Holborn,
London WC1V 7DP,
United Kingdom

Telephone No.:

0171 405 0356

Facsimile No.:

0171 831 9628

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filedthe description ☒ as originally filed
☐ as amended under Article 34the claims ☒ as originally filed
☐ as amended under Article 19 (together with any accompanying statement)
☐ as amended under Article 34the drawings ☒ as originally filed
☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: ENGLISH☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

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Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (<i>specify</i>) | : | sheets |

For International Preliminary Examining Authority use only

received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input type="checkbox"/> other (<i>specify</i>): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).



Martin J. NEWBY

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:
2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):
3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. ☐ The applicant has been informed accordingly.
4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.
5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

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PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)

PA 3341

Box No. I TITLE OF INVENTION

Laminated Materials and Containers Therefrom

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

Courtaulds Packaging Limited,
505 Ipswich Road,
Colchester,
Essex,
CO4 5HE,
United Kingdom.

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (i.e. country) of nationality:

United Kingdom

State (i.e. country) of residence:

United Kingdom

This person is applicant
for the purposes of:

☐ all designated
States

☒ all designated States except
the United States of America

☐ the United States
of America only

☐ the States indicated in
the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

ASHMAN, Philip Colin
4 Godfreys Wood,
Melton,
Woodbridge,
Suffolk, IP1L 1QY,
United Kingdom

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box
is marked, do not fill in below.)

State (i.e. country) of nationality:

United Kingdom

State (i.e. country) of residence:

United Kingdom

This person is applicant
for the purposes of:

☐ all designated
States

☐ all designated States except
the United States of America

☒ the United States
of America only

☐ the States indicated in
the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE: OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf
of the applicant(s) before the competent International Authorities as:

☒ agent

☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

NEWBY, Martin John
J.Y. & G.W. Johnson
Kingsbourne House,
229-231 High Holborn,
London WC1V 7DP,
United Kingdom

Telephone No.

Facsimile No.

Teleprinter No.

☐ Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

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Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet is not to be included in the request.

Name and address: (Family name followed by given name; for a legal entity: full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

BENNETT, Julian
9 Frere Way,
Fingringhoe,
Colchester,
Essex,
CO5 7BP,
United Kingdom.

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:
United Kingdom

State (i.e. country) of residence:
United Kingdom

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity: full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

BRANCH, Mark Graham
2 Park Close,
Ashby-de-la-Zouch,
Leicester
LE65 2FS,
United Kingdom.

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:
United Kingdom

State (i.e. country) of residence:
United Kingdom

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity: full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity: full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

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Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|--|--|
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AT Austria + Utility Model | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BB Barbados | |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CZ Czech Republic + Utility Model | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DE Germany + Utility Model | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DK Denmark + Utility Model | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> EE Estonia + Utility Model | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> FI Finland + Utility Model | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SK Slovakia + Utility Model |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GW Guinea-Bissau | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> JP Japan | |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> YU Yugoslavia |
| | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KR Republic of Korea | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | |
| <input checked="" type="checkbox"/> LC Saint Lucia | |
| <input checked="" type="checkbox"/> LK Sri Lanka | |
| <input checked="" type="checkbox"/> LR Liberia | |
| <input checked="" type="checkbox"/> LS Lesotho | |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐
- ☐
- ☐

In addition to the designations made above, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except the designation(s) of

The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

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Box No. VI PRIORITY CLAIMFurther priority claims are indicated in the Supplemental Box ☐

The priority of the following earlier application(s) is hereby claimed:

Country (in which, or for which, the application was filed)	Filing Date (day month year)	Application No.	Office of filing (only for regional or international application)
item (1) GB	21 March 1997	9705921.6	
item (2)			
item (3)			

Mark the following check-box if the certified copy of the earlier application is to be issued by the Office which for the purposes of the present international application is the receiving Office (a fee may be required):

☐ The receiving Office is hereby requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):
Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (If two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen: the two-letter code may be used): ISA /

Earlier search Fill in where a search (international, international-type or other) by the International Searching Authority has already been carried out or requested and the Authority is now requested to base the international search, to the extent possible, on the results of that earlier search. Identify such search or request either by reference to the relevant application (or the translation thereof) or by reference to the search request:

Country (or regional Office):

Date (day month year):

Number:

Box No. VIII CHECK LIST

This international application contains the following number of sheets:

1. request : 4 sheets
 2. description : 17 sheets
 3. claims : 2 sheets
 4. abstract : 1 sheets
 5. drawings : 1 sheets

Total : 25 sheets

This international application is accompanied by the item(s) marked below:

1. ☐ separate signed power of attorney
 2. ☐ copy of general power of attorney
 3. ☐ statement explaining lack of signature
 4. ☐ priority document(s) identified in Box No. VI as item(s):
 5. ☐ fee calculation sheet
 6. ☐ separate indications concerning deposited microorganisms
 7. ☐ nucleotide and/or amino acid sequence listing (diskette)
 8. ☐ other (specify):

Figure No. 3 of the drawings (if any) should accompany the abstract when it is published.

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).



Martin John NEWBY

For receiving Office use only

1. Date of actual receipt of the purported international application:	2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority specified by the applicant: ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

NEWBY, Martin J.
J.Y. & G.W. JOHNSON
Kingsboume House
229-231 High Holborn
London WC1V 7DP
GRANDE BRETAGNE

RECEIVED

- 1 JUL 1999

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year)

29.06.99

Applicant's or agent's file reference

PA 3341/113

IMPORTANT NOTIFICATION

International application No.

PCT/GB98/00855

International filing date (day/month/year)

20/03/1998

Priority date (day/month/year)

21/03/1997

Applicant

COURTAULDS PACKAGING LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference PA 3341/113		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/G898/00855	International filing date (day/month/year) 20/03/1998	Priority date (day/month/year) 21/03/1997
International Patent Classification (IPC) or national classification and IPC B32B27/08		
Applicant COURTAULDS PACKAGING LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 14/09/1998	Date of completion of this report 29.06.99
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel: (+49-89) 2399-0 Tx: 523656 epmu d Fax: (+49-89) 2399-4485	Authorized officer Schambeck, W Telephone No. (+49-89) 2399 2135 

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**International application No. PCT/GB98/00855

1. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*);

Description, pages:

1-17 as originally filed

Claims, No.:

1-15 as originally filed

Drawings, sheets:

1/1 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims. Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c));

4. Additional observations, if necessary:

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**International application No. PCT/GB98/00855

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Yes:	Claims	5, 8-10, 12-15
	No:	Claims	1-4, 6, 7, 11
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-15
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations**see separate sheet**

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB98/00855

The statements with regard to novelty and inventive step rely on the following documents, in particular those passages given in parentheses:

- (1) US-A-4 528 235 (column 1, lines 4 to 18; column 3, lines 49 to 56; column 4, lines 12 to 41; column 6, lines 35 to 38 and 51 to 54; column 8, lines 28 to 36)
- (2) WO-A-96/17885 (page 3, lines 5 to 16)
- (3) US-A-4 526 823 (column 2, lines 27 to 41; column 4, lines 29 to 49)
- (4) EP-A-0 494 594 (claims 1, 7, 8, 12 and 13)

1. Document (1) discloses laminated polymer films suitable for food packaging applications and including, expressed in the language of the present application, a barrier layer and a further layer formed from substantially non-polar thermoplastic resin filled with a platelet filler.

Document (2) teaches that compositions formed from a substantially non-polar thermoplastic resin and a platelet filler provide good barrier properties not only to oxygen but also to flavour molecules.

Claims 1 to 15 are considered not to define inventions which are non-obvious for the purposes of Article 33(3) PCT because they appear to merely supplement and concretise the disclosure of document (1) by

- (i) referring to the technical effect of "reducing the absorbability of a laminated material", which, although not mentioned in the prior art document, must inevitably be inherent in the teaching of that document,
- (ii) adding technical information derivable from documents (1) to (4) or forming part of the common general knowledge an expert in the relevant technical field may be expected to have been aware of, or
- (iii) introducing restrictions arbitrary in the sense that they do not contribute to the solution of a meaningful technical problem or, in the case of the restrictions

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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB98/00855

defined by the terms "flexible" and "high purity", being too vague and indefinite to clearly define a distinguishing feature over the prior art teaching of document (1).

2. The inventions defined by claims 1, 2, 3, 6 and 7 are considered to lack novelty over the disclosure of document (3).

3. The inventions defined by claims 1, 2, 4, 6, 7 and 11 are considered to lack novelty over the disclosure of document (4).

4. Referring to the applicants' submission that the problem of absorption of flavouring is not addressed in the prior art, it is to be noted that the inventions defined by the claims of a patent application cannot be considered to be novel and to involve an inventive step for the sole reason that a specific technical problem not mentioned in the prior art is addressed in the description of the application.

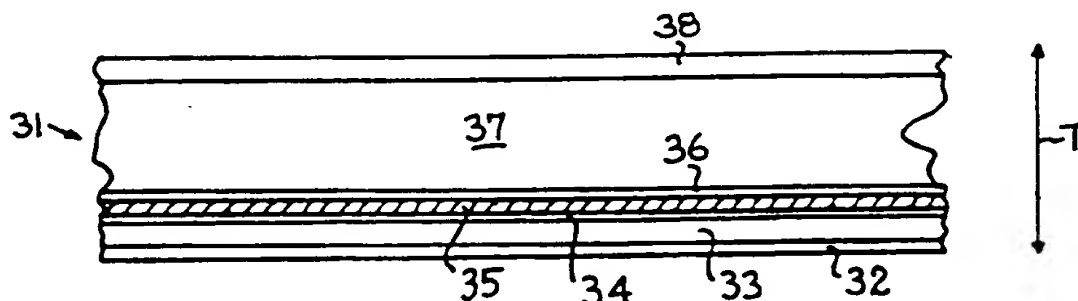
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/GB98/00855</p> <p>(22) International Filing Date: 20 March 1998 (20.03.98)</p> <p>(30) Priority Data: 9705921.6 21 March 1997 (21.03.97) GB</p> <p>(71) Applicant (for all designated States except US): COUR- TAULDS PACKAGING LIMITED [GB/GB]: 505 Ipswich Road, Colchester, Essex CO4 5HE (GB).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): ASHMAN, Philip, Colin [GB/GB]; 4 Godfreys Wood, Melton, Woodbridge, Suffolk IP1L 1QY (GB). BENNETT, Julian [GB/GB]: 9 Freer Way, Fingringhoe, Colchester, Essex CO5 7BP (GB). BRANCH, Mark, Graham [GB/GB]: 2 Park Close, Ashby-de-la-Zouch, Leicester LE65 2FS (GB).</p> <p>(74) Agent: NEWBY, Martin, John; J.Y. & G.W. Johnson, Kings- bourne House, 229-231 High Holborn, London WC1V 7DP (GB).</p>	<p>(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>	

(54) Title: LAMINATED MATERIALS AND CONTAINERS THEREFROM



(57) Abstract

A laminated material (31) having reduced absorbability for use in the manufacture of flexible containers and which in use has an intended inner surface (32) and an impermeable core barrier layer (35). The laminate (31) has at least one further layer (33), formed from substantially non-polar thermoplastics resin, preferably HDPE, filled with a platelet filler, preferably talc, positioned inwardly of the barrier layer (35).

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Laminated Materials and Containers TherefromTechnical Field

This invention relates to laminated materials and to flexible containers formed from laminated materials, in particular thermoplastics laminates that include a layer of material having good vapour barrier properties.

Background of the Invention

Thermoplastics materials are widely used in packaging because of their low cost and ease of forming into a variety of shapes. However, most thermoplastics materials suffer from the disadvantage of providing only a relatively poor barrier to gases and vapours. Packaging having poor gas barrier properties is particularly disadvantageous for packaging oxygen-sensitive materials, such as foodstuffs, which are to be stored in a non-refrigerated condition. It is also disadvantageous for packaging to have poor vapour barrier properties when packaging items which are sensitive to moisture vapour, for example foodstuffs and confectionery which deteriorate when they become damp, and when packaging items which include flavouring components which diffuse through the packaging material with consequent loss of flavour.

Thermoplastic containers which are used for the storage and delivery of flavoured materials, e.g. toothpaste, are required to store the materials for prolonged periods of time, e.g. up to three years, without substantial loss of flavouring.

It has generally been thought that loss of flavouring is due to two mechanisms, namely permeation and absorption. The loss of flavouring due to permeation has been ameliorated by the use of laminates containing barrier layers. A known thermoplastics material with good barrier

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properties is ethylene vinyl alcohol (EVOH) which is typically used as a thin layer sandwiched between layers of other thermoplastics materials, typically polyolefinic materials. Other known materials with good barrier properties to vapour transmission are polyamides, polyacrylonitrile and aliphatic polyketones, and aluminium foil.

A typical prior art laminate having a centrally positioned barrier layer is shown in Figure 1 which will be described later.

Laminates having a barrier layer arranged asymmetrically within the different layers of the laminated material are also known. Figure 2, which will be described in detail later, shows a prior art laminate in which an EVOH barrier layer is arranged towards the inside surface, in use, of the laminate. The provision of such a barrier layer appears to reduce the loss of flavourings from within the container.

However, EVOH and other barrier layers materials are generally expensive and therefore a number of attempts have been made at improving the gas barrier properties of polyolefinic materials. GB-A-1136350, for example, proposes the use of circular plate-like fillers with a ratio of diameter to thickness of between 20:1 and 300:1 and a diameter of at most 40 microns in polyolefin polymers selected from polyethylene, polypropylene, ethylene-containing copolymers containing at least 50 moles percent of ethylene, and polystyrene, the preferred amount of filler being from 0.1 to 50 wt% of the total weight of filled polymer. Such filled polymer compositions have been proposed for the manufacture of films, for example films for food packaging.

US-A-3463350 is concerned with the production of moulded containers for packaging foodstuffs, the containers being made from mixtures of high density polyethylene (HDPE)

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and mica particles, for example by compression or injection moulding. Such containers are said to reduce the discolouration of so-called canned corned beef as caused by oxygen compared with the use of similar containers made of HDPE filled with glass fibre or titanium dioxide instead of mica.

It has also been proposed in US-A-4528235 to incorporate platelet filler particles with an average equivalent diameter of from 1 to 8 microns, the maximum diameter being 25 microns, and a thickness of less than 0.5 microns, into HDPE having a melt index of from 0.01 to 1.0 g/10 minutes at 190°C as measured by ASTM D-1238 to produce films having a thickness of from 10 to 100 microns, with the intention of increasing the effectiveness of the barrier to oxygen of the films compared with films formed from unfilled HDPE.

In WO-A-96/17885, the contents of which are hereby incorporated into the present invention, there is proposed a moulding composition, and a method of making a moulding composition, for forming an article having increased barrier to gases and/or vapours, the method comprising the step of mixing together a substantially non-polar thermoplastics resin and a laminar filler, the laminar filler being capable of delaminating when the composition is subjected to high shear to increase the aspect ratio of the filler as it breaks down into platelets. WO-A-96/17885 further describes a composition containing 85 parts by weight of high density polyethylene and 15 parts by weight of talc that can be extruded in the form of a film or tube having increased barrier properties. The composition can be extruded as a single web, or can be co-extruded with other layers of material formed on one or other side of a core layer formed from the composition.

Disclosure of the Invention

The object of the present invention is to provide a laminated material which is relatively cheap and which has improved resistance to the loss of flavour in goods stored
5 in a container formed from the material.

According to one aspect of the present invention there is provided a method of reducing the absorbability of a laminated material used for the manufacture of flexible containers and which in use has an intended inner surface
10 and an impermeable core barrier layer, comprising arranging for at least one further layer, formed from substantially non-polar thermoplastics resin or material filled with a platelet filler, to be positioned inwardly of the barrier layer.

15 The platelet filler can be any of a variety of lamellar fillers provided the platelets delaminate under shear when the filler is blended with the non-polar thermoplastics resin before processing and more particularly when the mixture of filler and thermoplastics resin is
20 subjected to extrusion. Lamellar fillers include clays, mica, graphite, montmorillonite and talc.

Talc is a particularly preferred lamellar filler by virtue of its ease of delamination during shear. Talc, being a naturally occurring hydrated magnesium silicate, is
25 available in a variety of grades of greater or lesser purity. It has been found that the ease of increasing the aspect ratio of talc when it is subjected to high shear in a non-polar thermoplastics resin appears to increase as the level of impurities within the talc decreases. Thus not
30 only does it appear easier to delaminate the platelets of the talc, but the platelets themselves apparently resist fracture. Thus purer grades of talc are generally preferred since they lead to compositions which not only have good barrier properties but also have a high degree of whiteness

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without the necessity to include a white pigment such as titanium dioxide.

According to another aspect of the present invention, there is provided a laminated material for the manufacture of flexible containers and which, in use, has a surface intended to be external of the container and a surface intended to be internal of the container, the laminated material comprising an intermediate barrier layer of a thermoplastics material having, on its inner side, at least one further layer comprising substantially non-polar thermoplastics resin filled with platelet filler, preferably high purity talc.

The preferred non-polar thermoplastics resin is a polyolefin resin, for example a polymer derived from one or more aliphatic or aromatic alkylenes, e.g. a polymer containing units derived from at least one of ethylene, propylene, butylene, styrene, hexene and octene. The non-polar resin may also comprise a compound of one or more polymers as detailed below. Examples of specific polyolefin resins which can be used include polyethylene, polypropylene, ethylene/propylene copolymers, ethylene/propylene/butylene terpolymers, polyethylenes being particularly preferred by virtue of their good processing and welding characteristics. The polyethylene can be low density polyethylene, linear low density polyethylene (density of from 0.910 to 0.925 g.cm⁻³), medium density polyethylene, linear medium density polyethylene (density of from 0.925 to 0.950 g.cm⁻³), high density polyethylene (density of from 0.950 to 0.980 g.cm⁻³). High density polyethylene, or a compound of high density polyethylene and linear low density polyethylene, is particularly preferred by virtue of its higher inherent barrier properties compared with lower density polyethylenes.

The preferred HDPE resin has a density of at least 0.945 g.cm⁻³ and a melt flow index of from 4 to 10 g/10 min preferably 7 to 8 g/10 min, (2160 g load at 190°C) measured

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to ISO/IEC 1133. A suitable material is available from DSM grade 9089F.

The barrier layer may comprise any of the known barrier materials such as EVOH, amorphous polyamides, aluminium foil, etc.

Particularly preferred grades of talc for use in the present invention are sold by Richard Baker Harrison Group, England under the Trade Mark MAGSIL, and an especially preferred grade is "Magsil Osmanthus" which delaminates in processing to form platelets having an average aspect ratio of from 16 to 30 and a minimum aspect ratio of 5.

Since the purity of talc is related to its whiteness, the preferred talc forms a moulded composition, as described below, having a CIE whiteness index of at least 40. These CIE (Commission Internationale d'Eclairage) whiteness index values are determined for compositions containing 15 percent by weight of talc in high density polyethylene with no other filler present, the determination being in reflectance mode with UV light included and specular reflection excluded, the observer angle being 10° of arc and the samples being backed by a white tile.

The talc is blended with the polyethylene in the weight ratio of 15 parts to 85 parts of polymer using a twin screw extruder or Banbury type mixer with a temperature profile ranging from 150°C to 220°C, the mixture being subjected to high shear during mixing, and then being extruded and cut into pellets. The pellets are then compression moulded to form plaques at a temperature of 150°C and pressure of 0.39 tonnes for 5 minutes.

The CIE whiteness index is measured using a Macbeth Spectrophotometer 2020+.

According to a further aspect of the present invention there is provided a container having flexible

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walls formed from a laminated material having a core barrier layer of a thermoplastics material with at least one further layer arranged internally of the barrier layer, said one further layer comprising substantially non-polar thermoplastics resin filled with platelets of talc having an aspect ratio of at least 5, an average aspect ratio of from 16 to 30 and a CIE whiteness of at least 40.

The arrangement of a layer of talc-filled non-polar thermoplastics resin internally of the barrier layer enables the thickness of the thermoplastics barrier layer to be reduced, from typically 25 microns, to a thickness of from 5 to 15 microns, preferably 10 microns, without substantially affecting the overall losses of volatiles from within the container. This is because the absorption properties of the container wall material are improved, that is less material is absorbed, whilst the permeation rate through the thinned down barrier layer remains largely unchanged.

The laminate construction can be a substantially symmetrical construction with the barrier layer at the centre and a layer comprising non-polar thermoplastics resin filled with platelet filler being arranged both inside and outside of the barrier layer. This allows the laminate to be used either way round which has advantages in the production of containers.

Preferably the thermoplastics barrier layer is an ethylene vinyl alcohol material or amorphous polyamide material. Preferably the talc filled non-polar thermoplastics resin layer has a thickness of from 5 to 150 microns, preferably from 10 to 70 microns, more preferably about 50 microns, and is spaced from the barrier layer only by a tie layer.

Preferably the talc filled non-polar thermoplastics resin layer is spaced from the internal surface of the laminate by an additional inner layer of a non-polar

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thermoplastics resin in order to improve the weld characteristics of the laminate on its inner surface. The additional inner layer may also contain said platelet filler, preferably talc. Preferably the further layer is
5 formed from a high density polyethylene compound which may contain 15% by weight of talc filler, and at least a major, i.e. in excess of 50%, portion of high density polyethylene, and the additional layer is a linear medium density polyethylene. The further layer may alternatively comprise
10 a tie layer which is filled with talc filler, especially when used in combination with aluminium foil. A typical tie layer for use with aluminium foil comprises ethylene acrylic acid copolymer having an acrylic acid content of from 2 to 10%.

15 Brief Description of Drawings

The invention will now be described, by way of example only, and with particular reference to the accompanying drawing, in which:-

Figure 1 and Figure 2 are schematic representations of
20 prior art laminates;

Figure 3 is a schematic representation of both a control laminate and a first laminate according to the present invention; and

Figure 4 is a schematic representative of a second
25 laminate according to the present invention.

Detailed Description of the Invention

Sample 1

A known laminate 11, illustrated in Figure 1, has an overall thickness T of about 300 microns and comprises a
30 plurality of layers 12-20, the inner layer being identified layer 12 and the external layer being layer 20. The inner

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layer 12 comprises linear medium density polyethylene (LMDPE) having a thickness of about 75 microns, and the adjacent outer layer 13 comprises low density polyethylene (LDPE) having a thickness of about 20 microns. Externally of the layer 13 is a layer 14 of linear low density polyethylene (LLDPE) having a thickness of about 20 microns which is adhered to an ethylene vinyl alcohol (EVOH) barrier layer 16 (shaded for ease of identification) by a tie layer 15. The tie layer 15 typically comprises a maleic anhydride functionalised polyethylene of about 5 microns thickness and the barrier layer 16 has a thickness of about 25 microns.

Externally of the barrier layer 16 are a tie layer 17, a LLDPE layer 18 and a LDPE layer 19 which are substantially identical to the layers 15, 14 and 13, respectively. The external layer 20 is a layer of medium density polyethylene (HDPE) having a thickness of about 110 microns.

Sample 2

The second prior art laminate 21 shown in Figure 2 again has an overall thickness T of about 300 microns and comprises a plurality of layers 22-28, the inner layer being layer 22 and the external layer being layer 28. The inner layer 22 comprises LMPDE having a thickness of about 35 microns which is adhered to an EVOH barrier layer 24 (shaded for ease of identification) by a tie layer 23. The EVOH barrier layer 24 is about 15 microns thick and the tie layer 23 has a thickness of about 5 microns. Externally of the barrier layer 24 is another tie layer 25, a layer 26 of LLDPE having a thickness of 20 microns, a layer 27 of LLDPE or LDPE having a thickness of about 110 microns, and the external layer 28 of medium density polyethylene (MDPE) also having a thickness of about 110 microns.

With reference to Fig 3, there is shown a seven layer laminate 31 having an overall thickness of about 275 to 300 microns. This general laminate structure was used

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for a number of control samples 3-5, and a number of samples 6-13 according to the present invention. The laminate 31 from inside to outside comprises layers 32-38. The inner layer 32 is a layer of LMPDE about 25 to 35 microns thick.
5 The adjacent outer layer 33 is HDPE with a thickness of from 15 to 50 microns which is adhered to a barrier layer 35 by a tie layer 34. The barrier layer 35 is an EVOH layer or an amorphous polyamide layer. The barrier layer 35 is about 10 to 15 microns thick and the tie layer 34 has a thickness of
10 about 5 to 7.5 microns. Externally of the barrier layer 35 is a second tie layer 36, an outer HDPE layer 37 having a thickness of from about 50 to 190 microns, and an external LHPDE layer 38 having a thickness of about 25 to 35 microns.

The thickness in microns of the various layers for
15 each control sample is given in Table 1 below.

The samples 6-13 according to the present invention include layers of polymer filled with 15% ww talc (Magsil Osmonthous) arranged inside of the barrier layer 35. The structure of samples 6-13 are also given in Table 1
20 below with the layer thickness in microns.

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Table 1

	Control Samples			Samples according to the Invention							
	3	4	5	6	7	8	9	10	11	12	13
Layer 32	25	25	25	25	35	35	25	25	15	25	25
Layer 33	50	48	25	50*	15*	15*	15*	15*	20*	15*	25*
Layer 34	7.5	6	5	7.5	5	5	5	5	5	5	5
Layer 35	10**	15	15	10**	10**	10**	15	15	15	10	10
Layer 36	7.5	6	5	7.5	5	5	5	5	5	5	5
Layer 37	150	150	175	50*	145*	125*	185	185	200	165*	155
Layer 38	25	25	25	25	35	35	15	25'	15'	25'	25

* = 15% ww talc filled material

** = Amorphous polyamide basic layer

' = 1% ww talc filled material

15 Other laminates 41 according to the invention are shown in Fig 4 which shows a five layer laminate.

The laminate 41 comprises an inner layer 42 of talc filled LMDPE or HDPE, a tie layer 43, a barrier layer 44 of amorphous polyamide, an outer tie layer 45 and an outer layer of talc filled HDPE or LMPDE 46. The thicknesses in microns of the various layers for samples 14-17 according to the present invention are shown in Table 2 below.

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Table 2

Sample				
Layer	Sample 14	Sample 15	Sample 16	Sample 17
Layer 42	87* LMPDE	110* LMPDE	118* HDPE	166* HDPE
Layer 43	5	5	5	5
Layer 44	15	140	10	17
Layer 45	5	5	5	5
Layer 46	67* LMPDE	59* LMPDE	72* HDPE	155* HDPE

* 15% ww talc

Absorption Tests

The laminate material samples 1 to 17 were hermetically sealed across the mouths of 500 ml jars each containing a
 5 flavouring from the following: limonene, cineole, menthone and carvone. The mouths of the jars had a diameter of 48 mm to give an exposed area of laminate of 0.00181 m². The jars were maintained at a temperature of 25°C and at atmospheric pressure. The laminate samples were weighed periodically
 10 and the maximum absorption for all flavourings reached a substantially steady state after 7 days (168 hours).

The results of the tests for the prior art samples 1 and 2 are given in Table 3 below.

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Table 3

Absorption as weight (grams) gain per square meter after 7 days

Flavouring	Sample 1	Sample 2
limonene	9.4444	3.9444
cineole	8.5552	4.3332
menthone	5.3332	2.7220
carvone	1.7222	1.0000

5 The results for samples 1 and 2 demonstrate that the
10 placement of the barrier layer 24 closer to the inside
surface of the laminate as in sample 2 is beneficial even
though the thickness of the barrier layer 24 has been
reduced in comparison to that of the barrier layer in sample
1, and the overall thickness of the laminate remains the
15 same.

The results on the tests conducted on the samples of
laminate constructed in accordance with Fig 3 are given
below in Table 4.

20 If the results for sample 3 are compared with results
for sample 6 it can be seen that sample 6, which is a sample
according to the invention, has unexpectedly good absorption
properties in that the barrier layer 35 in sample 6 is
spaced 82.5 microns from the internal surface of the
laminate, which distance is identical to the spacing of the
25 barrier layer 35 from the internal surface of the laminate

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of control sample 3. The improvement in absorption properties is due to the replacement of the HDPE layer 33, in sample 3, with the talc-filled HDPE layer of sample 7.

The talc-filled layer 33, which is inside the barrier layer 35, helps reduce the weight loss of flavouring due to absorption into the laminate. The talc-filled layer should be from between 5 to 150 microns in thickness, preferably from about 15 to 70 microns and more preferably about 50 microns in thickness. The talc-filled layer also tends to stiffen the laminate allowing a laminate of reduced overall thickness to be used whilst still maintaining a relatively stiff material.

Similarly, if the control sample 4 is compared with Sample 10 it can be seen that there is a marked decrease in flavour absorption due to the addition of talc to the inner HDPE layer 33 despite this layer being thinner in sample 10. A comparison between sample 5 and sample 13 shows a similar improvement on the absorption properties merely by adding talc to the inner HDPE layer 33.

A comparison between samples 10, 11 and 12 indicates that the absorption properties can be enhanced by including talc filler within the inner LMDPE layer 32.

A comparison between samples 9 and 12 would indicate that it is not critical whether the talc filler is included in the LMDPE inner layer 32 as in sample 12 or the HDPE inner layer 33 as in sample 9. The benefit is obtained by both constructions.

From samples 6, 13 and 9 it would be seen that the maximum benefits are obtained by keeping the talc filled HDPE inner layer down to a thickness of between 15-20 microns.

From samples 14-17 the absorption results are given in Table 5 below for a comparison between samples 15 and 16 the

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absorption properties are achieved by including the talc in HDPE rather than LMDPE, and that the inner layer containing the talc should be as thin as is possible for best reductions in absorption.

Table 4

Absorption as weight (g) gain per square meter after 7 days

	Control Samples			Sample According to the Invention								
	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10	Sample 11	Sample 12	Sample 13	
Flavouring												
limonene	11.2220	6.7600	4.2200	5.3880	3.9440	3.8320	3.1120	3.500	2.6680	3.2760	3.6640	
cineole	9.9444	5.8800	3.7760	4.5560	3.5560	3.4440	3.0880	3.000	2.3880	2.7240	3.3888	
menthone	7.2776	4.5600	2.5520	3.5560	2.2760	2.2240	1.7240	1.8320	1.5480	1.6680	2.0520	
carvone	4.8332	2.440	1.6640	2.6120	1.4440	1.3320	1.2240	1.1120	1.1680	1.1680	1.9440	

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Table 5Absorption as weight (g) gain per square meter after 7 days

Samples of Second Embodiment				
flavouring	Sample 14	Sample 15	Sample 16	Sample 17
limonene	6.28	8.84	4.84	7.88
cineole	5.12	7.60	4.44	5.88
menthone	3.32	5.88	2.96	5.28
carvone	2.32	4.60	2.28	3.88

The laminate construction including the single layer 42 of talc filled HDPE on the inside of the barrier layer 44 has absorption properties that are improved over the contract sample 3 which has a similar thickness of non-polar polyethylene layer inside of an amorphous polyamide barrier layer.

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CLAIMS

1. A method of reducing the absorbability of a laminated material used for the manufacture of flexible containers and which in use has an intended inner surface and an impermeable core barrier layer, said method comprising arranging for at least one further layer, formed from substantially non-polar thermoplastics resin filled with a platelet filler, to be positioned inwardly of the barrier layer.
2. A method according to claim 1, wherein the platelet filler comprises a high purity talc.
3. A method according to claim 1 or 2, wherein said further layer is adjacent the barrier layer and is adhered thereto by a tie layer.
4. A method according to any one of claims 1 to 3, wherein, in order to aid welding of the laminated material, the further layer is spaced from the inner surface of the laminated material by an additional layer of non-polar thermoplastics resin material.
5. A method according to claim 4, wherein said additional layer is also filled with a platelet filler.
6. A laminated material for the manufacture of a flexible container and which, in use, has a surface intended to be external of the container and a surface intended to be internal of the container, the laminated material comprising an intermediate barrier layer of thermoplastics material having, on its inner side, at least one further layer comprising substantially non-polar thermoplastics resin filled with platelet filler.
7. A laminated material according to claim 6, wherein the platelet filler comprises high purity talc.

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8. A laminated material according to claim 6 or 7, wherein the further layer has a thickness of between 20 and 150 microns, preferably about 50 microns.

9. A laminated material according to any one of claims 5 6 to 8, wherein said further layer comprises high density polyethylene, or at least a major portion of high density polyethylene.

10. A laminated material according to claim 9 when dependent upon claim 7, wherein said further layer comprises 10 from 5% to 30% by weight of talc.

11. A laminated material according to any one of claims 6 to 10, wherein said further layer is spaced from the internal surface of the laminated material by an additional layer of non-polar thermoplastics resin material.

12. A laminated material according to claim 11, 15 wherein said additional layer is also filled with a platelet filler.

13. A laminated material according to any one of claim 6 to 12, wherein said barrier layer has a thickness of from 20 5 microns to 25 microns, and said further layer has a thickness of about 50 microns.

14. A flexible container having walls formed from a laminated material as claimed in any one of claims 6 to 13.

15. A flexible container having flexible walls formed 25 from a laminated material having a core barrier layer of a thermoplastics material with at least one further layer arranged internally of the barrier layer, said one further layer comprising substantially non-polar thermoplastics resin filled with platelets of talc having an aspect ratio 30 of at least 5, an average aspect ratio of from 16 to 30 and a CIE whiteness of at least 40.

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